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ABSTRACT

A general observation about the vocabularies of most languages is that they tend to increase in size over time. Little is known about the causal mechanisms involved in this lexical expansion, but most anthropologists and linguists are in agreement that it probably mirrors general cultural evolution. The study of lexical growth becomes important if it reveals regularities that allow for useful generalizations and predictions about the broader problem of linguistic evolution. This study focuses on the development of plant names, and with the assumption that man's vocabulary for kinds of plants has developed over time, asks (1) whether regularities in the ethnobotanical lexicons of past and present day languages can be observed that allow inferences as to the major patterns of nomenclatural growth, (2) whether such patterns are related to other aspects of man's socio-cultural development, and (3) whether such regularities have productive implications for the evolution of vocabulary in general. (Author/CLK)

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SPECULATIONS ON THE GROWTH OF ETHNOBOTANICAL NOMENCLATURE

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Speculations on the Growth of Ethnobotanical Nomenclature

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"It is impossible that men, even the most primeval and unlettered, manage their affairs with various denizens of the plant world without classifying them. Names of plants, generic and specific, and also other names more comprehensive, are part of the vernacular of every tribe of the uncivilized, as well as that of every rural province within the bounds of civilization to-day. The very names attest the fact of classification; for no name is that of an individual plant. It is that of a group of plants, always; a group specific, generic or more comprehensive than either".

Edward Lee Greene
Landmarks of Botanical History (1909:39)

1. Introduction

A general observation about the vocabularies of most languages is that they tend to increase in size over time. This pattern is more readily seen when one thinks in broad evolutionary terms, comparing the development of the rudimentary lexicon of early Homo sapiens to the complex vocabularies of modern man. We know almost nothing about the causal mechanisms involved in this lexical expansion but most anthropologists and linguists would not quibble about the fact that it most likely mirrors general cultural evolution.

That languages increase the size of their vocabularies through time is, of course, a trivial observation. The study of lexical growth becomes a topic of relevance only if it is possible to point out regularities that allow for useful generalizations and predictions about the broader problem of linguistic evolution.

In this essay, I hope to focus on the development of one area of vocabulary common to most, if not all, languages, --names for categories of plants. I will assume that man's vocabulary for kinds of plants has developed over time, an assumption that allows one to ask at least the following questions: Can one observe regularities in the ethnobotanical lexicons of past and present day languages that allow one to make plausible inferences as to the major patterns of nomenclatural growth? If such patterns can be described, are they related to other aspects of man's socio-cultural development? And, finally, do such regularities appear to have productive implications for the evolution of vocabulary generally?

I would like to propose in this openly speculative paper that one can in fact recognize some rather general patterns in the development of ethnobotanical nomenclature that are not necessarily self evident. I can make no claims, however, that the ideas presented here are based on well documented empirical studies. In fact, many of the examples I cite as evidence are drawn from incomplete descriptions of ethnobiological systems. Nonetheless, as further information becomes available, I have become more strongly convinced that the nomenclatural principles sketched here have wide-spread applicability. I also believe that their recognition may serve as a useful starting point for further research on the evolution of other lexical domains, specifically ethnozoological nomenclature, and, more broadly, to vocabulary generally.

2. The six universal categories of ethnobotanical nomenclature

It now appears that the ethnobotanical lexicons of all languages can ultimately be described given the recognition of six major ethnobotanical categories. These six basic categories will be labelled as follows:

1) generic
2) specific
3) major life form
4) varietal
5) intermediate
6) unique beginner

The names of plant taxa occurring as members of these categories will be, accordingly, generic names, specific names, major life form names, and so on.

It is furthermore suggested that in the life histories of individual languages, the encoding of each of these nomenclatural categories occurs in a relatively fixed order. Generic names are considered fundamental and will appear first. These will be followed in time by major life form names and specific names. At yet a later period, intermediate taxa and varietal taxa will be labeled. Finally, the last category to be lexically designated in the development of any ethnobotanical lexicon will be the unique beginner. The suggested sequence can be seen diagrammatically as follows:

$$\text{generic} \rightarrow \left\{\begin{matrix}\text{life form}\\ \text{specific}\end{matrix}\right\} \longrightarrow \left\{\begin{matrix}\text{intermediate}\\ \text{varietal}\end{matrix}\right\} \longrightarrow \text{unique beginner}$$

Several clarifications of the above sequence should be noted. The first is to indicate that each of the nomenclatural categories, with the exception of the unique beginner, is theoretically an open class. Thus, given the appearance of the generic category a language may continue to encode generic taxa throughout its history. The same applies to the specific category. The major life form, intermediate and varietal categories are likely to be few membered classes when compared with the generic and specific. This observation is probably a reflection of the nature of the recognizable discontinuities of the plant world as will be seen in more detail in the following sections.

Secondly, it should also be observed that no temporal ordering is implied for some categories. Thus, no claim is made as to the priority, in time, of specific names over major life form names. On the other hand, a claim is made that a language must have encoded at least one major life form name and one specific name before the appearance of intermediate and varietal named taxa.

As well as noting a general progression in terms of an increase in the number of ethnobotanical nomenclatural categories in a particular language's history, one may also describe a regular sequence of lexical development for members within each category. Thus, given the appearance of the specific category, one may observe the further linguistic development of specific names from lexically marked to lexically unmarked expressions. The same observation holds for each category. This general feature suggests that languages may not only be rated in terms of the number of ethnobotanical nomenclatural categories encoded but can be ranked as well in terms of the extent to which members of particular categories have passed from a marked to an unmarked status.

3. The reality of natural groupings of organisms

Man is by nature a classifying animal and no where is this fact exemplified more clearly than in his classification of the biological universe. But unlike the sometimes capricious and apparently arbitrary classification of certain social phenomena, all men appear to be constrained in their conceptualization of the world of plants and animals. It now seems clear that certain naturally occurring groupings of organisms are recognized as discrete classes in societies which maintain a direct and intimate contact with nature. While several ethnographers have long assumed this to be true, (cf. especially Lévi-Strauss 1966), the recent work of Ralph Bulmer presents the most explicit statement to this effect. In a series of perceptive papers on the ethnoscience of the Karam of New Guinea (Bulmer 1967, 1968, 1970; Bulmer and Tyler 1968), Bulmer convincingly demonstrates the psychological reality of such natural groupings. He generalizes to all folk systems of ethnobiological classification and states that "...in any total classification of plants and animals there are important lower order categories which are seen as 'objective' by the users of the classification and which are the smallest logically natural units defined by multiple criteria..." (Bulmer 1970:).

These minimal, naturally occurring units may or may not correspond in a one-to-one fashion to modern biologically defined taxa, although they generally do (Bulmer and Tyler 1968, Bulmer 1970; Berlin, Breedlove and Raven 1966; Diamond 1966). They are logically comparable, however, in that in numerous instances such groupings are formed on the basis of "...objective regularities and discontinuities in nature" (Bulmer 1970:).

The essence of Bulmer's generalizations are clearly in accord with recent research in Tzeltal botanical ethnography (Berlin, Breedlove and Raven, in preparation), as well as with the work of Conklin (1954), Lévi-Strauss (1966) and others who have worked closely with ethnobiological materials.

4. The primacy of generic names

In the ethnobiological lexicons of all languages, one is immediately struck by the structural uniformity of expressions which linguistically characterize man's recognition of the basic objective discontinuities of his biological world. These expressions are, for the most part, unique 'single-words' that can be said to be semantically unitary and linguistically distinct. Examples of such semantically unitary names in English folk biology would be oak, pine and maple. Primary terms of this sort appear to represent the most commonly referred to concepts of the botanical world and can be referred to as generic names. There may or may not be expressions of greater generality (e.g. tree, vine) or specificity (e.g. black oak, sugar maple), a fact which later will be shown to have important evolutionary implications.

An explicit recognition of these psychologically basic ethnobotanical generic terms can be traced ultimately to Theophrastus, the father of Western systematic botany (see Greene 1909). A more recent exploration of the subject has been provided by the ethnobotanist, Harley Harris Bartlett, in his important paper "History of the Generic Concept in Botany" (1940). Bartlett, a good field biologist with considerable ethnobotanical

experience on several Malayan tribes, noted that a well defined idea of genera could be found in all of these languages. For Bartlett, the "...concept of genus must be as old as folk science itself" (1940:341). He defined the concept as any class "...which is more or less consciously thought of as the smallest grouping requiring a distinctive name" (ibid:356, emphasis added). While somewhat vague as a definition, Bartlett's idea concerning the fundamental nature of generic taxa and their corresponding distinctive labels is essentially correct. In fact, generic names can be seen to exhibit a readily identifiable linguistic structure which allows, in most cases, for their immediate recognition (Berlin 1969, Berlin, Breedlove and Raven n.d.; Conklin 1962:122; Bulmer and Tyler 1968; Friedrich 1970).

The centrality of named generic taxa as "semantic primitives" (Friedrich 1970:156) in ethnobotanical classification has important evolutionary significance as concerns the growth of ethnobotanical nomenclature. The most obvious one is that generic names are the first to become encoded in the ethnobotanical lexicons of all languages. Thus, one may postulate a period in the development of the plant lexicon of any language whereby one finds a series of plant classes, each labelled by generic names, which partially partition a yet unlabelled taxon best glossed as 'plant'. (It will be shown that 'plant' is the last taxon to be uniquely labelled in any plant lexicon.)

It should be reiterated that the partition of the unlabelled category, 'plant', is not exhaustive at this time and that numerous, potentially namable classes remain unlabelled by generic forms and are linguistically ignored. I would also emphasize the fact that folk generic taxa are likely to correspond to botanical genera only in those cases where the scientific classification reflects obvious morphological characteristics of plant groupings which are readily observable by simple visual inspection. Thus, some folk generics will match almost perfectly standard botanical genera, e.g. oaks, pines, etc, while others will be more inclusive, e.g. cacti, ferns, and so on.

4.1 Horizontal expansion of generic names

It is supposed, then, that at some point in the development of a language's ethnobotanical nomenclature one finds a single-leveled taxonomy comprised solely of generic taxa labelled by generic names. Through time, groupings of organisms earlier not recognized linguistically will be named. If one attempts to speculate on how this hypothetical early plant taxonomy expanded, the most plausible argument at the moment is that the direction was, at first, horizontal. By horizontal growth I mean the formation of new generic names. The linguistic process of analogy , i.e. when some new category is seen to be conceptually related to an already existing category and named accordingly, is an extremely common form of name formation in contemporary languages. One can assume it to have been productive at an earlier time as well. Heinz Werner has discussed this process from a psychological viewpoint and has referred to it as "concrete transposition". This process "... can frequently be observed in every-day speech. It occurs whenever one uses the expression 'something like' or the suffix '-like' or '-ish', for the description of an object. Concrete transposition is at the basis of many creations of words and changes of meanings.... " Concrete transposition is involved if the Ewe Negroes call 'soup (tsi) 'kind of water (tsi)' (tsi, from tsi-e, e meaning 'like')" (Werner 1954: 204).

Concrete transposition forms an important part of the naming of behavior of the Tzeltal and Tzotzil Mayan Indians of Southern Mexico. When presented with a plant that is conceived to be 'related' to a known plant class, the typical Tzeltal informant will respond that it is "kol pahaluk sok x", i.e., 'it is likened to/related to' some already named class, x. The same semantic information is indicated by the Tzotzil expression "k'os x" 'like' x. In both languages, the process is a very common one, allowing for the classification of the vast majority of all plants in the environment, inasmuch as most plants are seen to be related to some named class. An identical situation has been reported by Bright and Bright (1965) for the Tolowa speaking Smith River Indians of

California and by French (1960) for the Sahaptin Indians of Oregon.

The most thorough going example of this kind of naming that I have found, however, is reported for a group of Arawak speakers of Surinam. Stahel (1944) notes that "Arawak Indians in Surinam, when they are naming plants and animals, make liberal use of the suffix BALLI to reduce the number of primary or 'generic' names of the hundreds maybe thousands of kinds they have to distinguish. For this purpose they have still two other words--DJAMARO and OJOTO. The first means the same as BALLI, the second 'related to'" (1944:268). As an example, one may note the following set of Arawak plant names, using Stahel's orthography.

TÁTABU	Diplotropis guianensis Benth.
TÁTABUBALLI	Coutarea hexandra K. Schum.
TÁTABU DJAMARO	Copaifera epunctata Amsh.
TÁTABU OJOTO	Ormosiopsis flava Ducke

Stahel states that "All four are high jungle trees. The first, 'zwarte kabbes', is a well known Surinam timber, the others are less important but all resemble TÁTABU" (ibid:269).

There is some doubt that most linguistic anthropologists would treat the examples mentioned above as legitimate plant names. In a real sense, concrete transposition is a method of making new labels by the use of descriptive phrases. The principle, however, is a productive one and it may become so prevalent, in horizontal expansion of generic names, that descriptive phrases are eventually replaced by genuine lexical expressions.

Such an advance may be illustrated in certain of the Mayan languages whereby one notes the use of a generic name plus an animal name to refer to a plant class seen to be related to one indicated by the generic name alone. In Tzeltal one finds numerous sets like the following:

č'omate? 'chayote' (Sechium edule (Jacq.) Sw.)

č'omate?č'o 'rat's chayote' (Cyclanthera bourgeana Naud. ex Char.)

ʔišim 'corn' (Zea mays L.)
ʔišim ʔahaw 'snake's corn' (Anthurium spp.)

k'ewes 'custard apple' (Annona cherimola Miller)
k'eweš maš 'monkey's custard apple' (A. reticulata L.)

In Yucatec Maya, the process is also typical, as can be seen in this example from Roys (1931:223):

Cat 'tree cucumber' (Parmentiera edulis DC.)
Cat-cuuc 'squirrel's tree cucumber' (P. aculeata HBK.)

An identical process in naming generic classes which are seen to be related in some form or other is also found in Hanunóo (Conklin 1954) and Subanun (Frake, personal communication), both languages of the Philippines, and Nahuatl of Central Mexico (Paso y Trancoso 1886). The usage of the adjective 'false' and 'mock' in American English folk botany may lead to the formation of generic names in an analogous fashion, e.g., lilac: false lilac; cypress: false cypress, orange: mock orange, and so on.

It is important to note that names formed by analogy of the sort just described are legitimate generic forms and are not conceptually seen as subordinate taxa. Thus, mock orange is not a kind of orange, it is simply like orange in some respect. This point is illustrated nicely by reference to the writings of Theophrastus as discussed by Edward Lee Greene in his little read Landmarks of Botanical History (1909). Greene notes that about half of Theophrastus' generic names are complex expressions including a noun and an adjective. Several appear to be derived from generic names of a single constituent, e.g., Calamos 'reed grass' (Arundo spp.) and Calamos Euosomos 'sweet flag' (Acornus calamus). But Greene has no doubts about Theophrastus' classification of Calamos and Calamos Euosomos as distinct genera. He writes:

> It is not imaginable that a botanist of Theophrastus' ripe experience and great attainments should think those large grass-plants and the sweet-flag to be of the same genus. Beyond doubt, however, the name Calamos Euosomos did originate in the notion that arundo and acornus are next of kin; for, however, unlike they are as to size, foliage, and other particulars, there is a remarkably close similarity in their rootstocks, these being of almost the same size, form and color in the two. The gatherers of roots and herbs, as we know, looked first of all to the 'roots' of things, and these were their first criteria of plant relationships. To these it should be perfectly natural to place the sweet-flag alongside arundo, the true [Calamos] by its closely imitative 'root', and then on account of the aromatic properties of the root to call the plant [Calamos Euosomos] (Greene 1909: 123).

Finally, it should be observed that the conceptually central name in a pair consisting of a generic name and one formed by semantic analogy is lexically unmarked, i.e. it occurs in an unmodified form, while the non-central and historically secondary expression is distinguished by a modifier of some sort. As will be seen a little further on, this process of lexical marking is a most productive form of name formation in the over-all development of ethnobotanical nomenclature.

In summary, I have suggested that the original ethnobotanical vocabulary of any language (and, by implication, the vocabulary of early man) is at first comprised solely of semantically unitary linguistic expressions which mark the smallest conceptually relevant groupings of plants in man's environment. These expressions are known as generic names.

At the outset, the expansion of generic names is seen to be accomplished via the process of concrete transposition. It is expressed first in the form of descriptive or descriptive-like phrases or expressions which at a later period in the history of a language may be more formally codified by the formation of definite lexical forms. This form of expansion is to be joined by the processes of generalization and differentiation as nomenclature develops over time. Concrete transposition is to remain, however, as a potentially productive process throughout the history of a language's development.

5. Differentiation and generalization: The appearance of specific and major life form names.

I had at one time hoped to show that specific names become encoded in a language's ethnobotanical lexicon before the appearance of major life forms such as 'tree', 'vine', 'grass' and so on. The data that I have been able to gather at this time do not allow for a definitive answer as to which ethnobotanical category may be prior. I know of no language which lacks at least some specific plant names, although there may have been languages, such as that spoken by the Tasmanians, which lacked general life form terms. The evidence on this point, however, is scanty and probably unreliable.

Consequently, a weaker hypothesis is presented here which posits no temporal distinction as to the rise of specific and supra-generic categories, although further research may well require a modification of this view.

6. Differentiation and the formation of specific names

In Bartlett's paper on the genus concept, he also noted that "With enlarging experience, people make finer distinctions and need different names for newly distinguished entities which have previously been called by the same original name. The original name becomes generic in its application; variously qualified it provides the basis of specific names' (1940:349).

I would take issue only with Bartlett's phrase "...The original name becomes generic in its application..." It had originally been generic and, with enlarging experience, is merely partitioned into sub-classes.

There appears to be some psychological evidence to support such a position. Werner notes "...that the predominant developmental trend is in the direction of differentiation rather than of synthesis. [Likewise], the formation of general concepts from specific terms is of lesser importance in non-scientific communication though it is rather a characteristic of scientific endeavor. In other words, language in every-day life is directed toward the concrete and specific rather than toward the abstract and general.

Because of this trend toward the concrete, semantic generalization develops slowly and by intermediate steps" (Werner 1954:203).

If differentiation is to occur and be lexically encoded, there appears to be a fairly concise way in which one can imagine it happening. First, the division of a generic name is most probably binary, at least at the outset. This observation is borne out in fact in present day folk taxonomic systems which have been well studied. By far the greatest number of contrast sets comprised of specific taxa in folk bio-taxonomies are comprised solely of two specific names (Berlin, Breedlove and Raven in preparation, Conklin 1954:128).

6.1 Type-specific nomenclature

Furthermore, it now appears clear that a highly regular labelling process can be described for the encoding of specific taxa, given the primarily binary partition of a generic taxon. In general, one specific category, because it is most wide spread, larger, best known, or the like, will always be recognized as the best representation of the set. This taxon can be referred to as the type-specific, the archtype, or to use Platonic terms, the ideal type. "Type-species" have long been recognized in systematic biology. The notion, codified by Linnaeus, can be seen to have its origin in folk biosystematics since earliest times and has been reported by many anthropologists working with societies intimately involved with nature. Dentan, who has worked extensively with the primitive Semai of Southeast Asia, notes: "My impression is that the Semai think that some species are more 'typical' of their categories than other species are. For example, naga (snakelike dragons) seem to represent the quintessence of 'they beneath the earth'. Giant monitors, in turn, are the prime representatives of 'lizard', and regal python of 'snake'" (Dentan 1968:35).

A strikingly general nomenclatural regularity can also be suggested as regards the relationship of the type specific, its contrasting non-typical specific, and the superordinate generic name. In the early stages of the

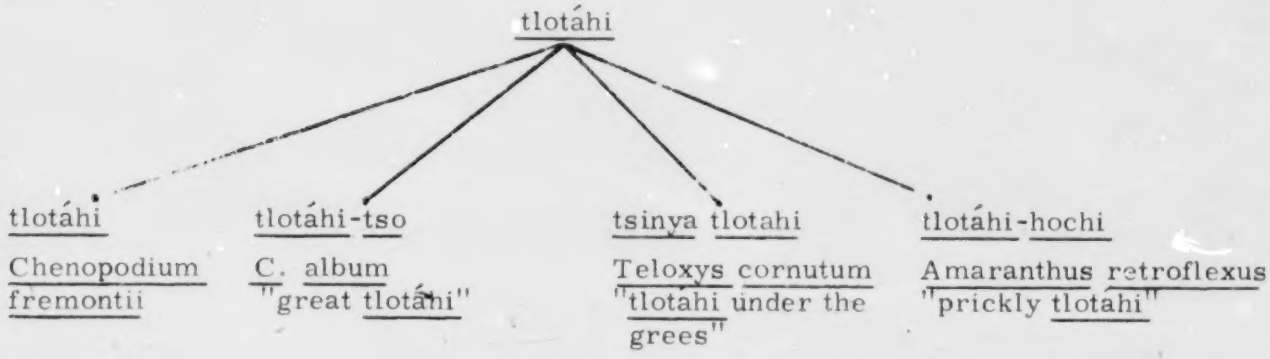
division of a generic taxon into two specific categories, the type specific will invariably be polysemous with its superordinate generic in characteristic usage. Stated in other terms, the type specific taxon will be lexically unmarked in normal speech, being referred to by the identical linguistic expression as its superordinate generic. Such polysemous labelling of taxa at differing levels of generalization has been discussed by Frake (1962) and Conklin (1962) in reference to folk biosystematics and by Greenberg (1966) in reference to lexicon in general. Several examples will illustrate this nomenclatural principle. As Wyman and Harris have said in referring to Navaho ethnobotany, "The situation is as if in our binomial system the generic name were used alone for the best known species of a genus, while binomial terms were used for all other members of the genus" (1941:120).

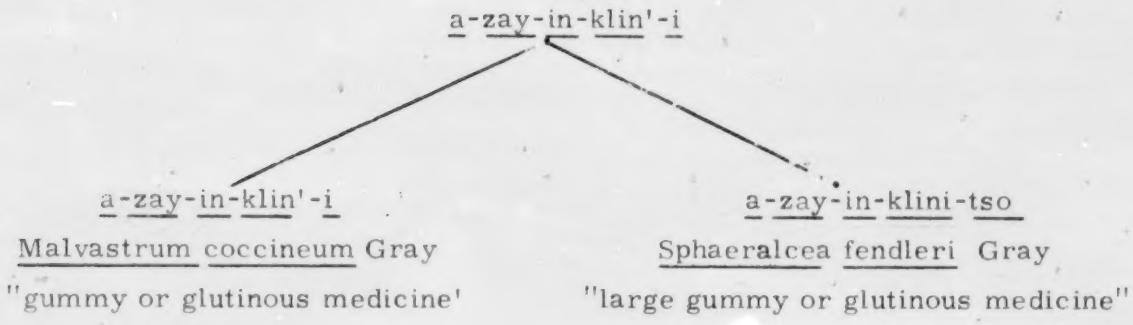
Matthews (1886) was the first to recognize explicitly type-specific nomenclature in Navaho. In an especially careful piece of research for its time, Matthews notes that "...there are three species of juniper growing in the Zuni mountains; each has its own appropriate name, yet the generic name for juniper...appears in all" (1886:767). Diagrammatically:

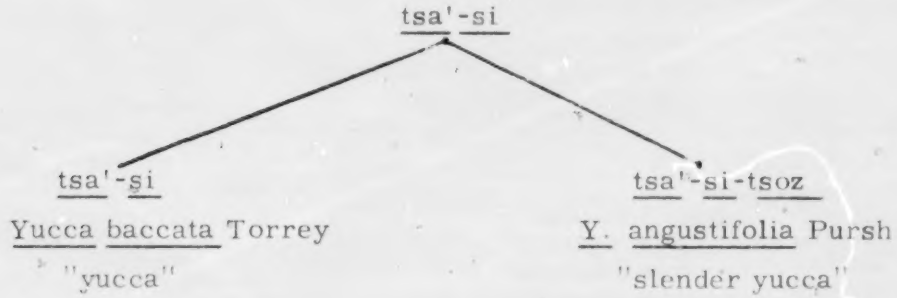
kat
'Juniperus spp.'

kat	kat-nee-ay-li	kat-dil-tah'-li
Juniperus communis L.	J. virginiana L.	J. pachyphaloea Torrey
'common juniper'	'strained juniper'	'cracked juniper'

Several other examples found in Matthews show the same principle at work:







Classical Nahuatl also exhibits this nomenclatural regularity in that the most common specific form included in a particular generic class is labelled polysemously be the generic name. Thus, one observes that in the Nahuatl classification of sedges, tollin included a "...type-species [sic] that carried simply the name Tollin and that [also] referred to the sedge family, various other related species of it having been grouped under the same name, each with a different determination" (Paso y Troncoso 1886:218).

A final example of polysemous generic and type-specific plant names can be seen again in the early work of Theophrastus, who, as a plant nomenclator, took great pains to preserve the essential structure of the names discovered to be in common usage in his day. As Greene says, Theophrastus "... left plant nomenclature as he found it" (1909:123). Greene captures the essence of the early botanist's view aptly:

> The Theophrastan nomenclature of plants is as simply natural as can be imagined. Not only are monotypic genera called by a single name; where the species are known to be several, the type-species of the genus--that is, that which is most historic--is without a specific name, at least very commonly, and only the others have each its specific adjective superadded to the generic appelation (Greene 1909:120).

The following examples attest to this fact:

[Theophrastus' names]	[Modern equivalents]
Peuce	Pinus picea
Peuce Idaia	P. maritima
Peuce conophoros	P. pinea
Peuce paralios	P. halepensis
Mespilos	Mespilos cotoneaster
Mespilos anthedon	Crataegus tominalis

6.2 Lexical marking of type-specific names

While many languages find no need to linguistically mark the focal type-specific within a particular grouping of specific names, a situation which I suggest is characteristic of the process employed in the earliest

specific name formation, situations of social intercourse may arise whereby one must be able to linguistically differentiate the type-specific category from its contrasting neighbor(s). The linguistic process by which this contrast comes to be indicated is also quite general. Invariably, the type-specific will be modified with an attributive like expression best glossed as 'genuine', 'real', or 'ideal-type'.

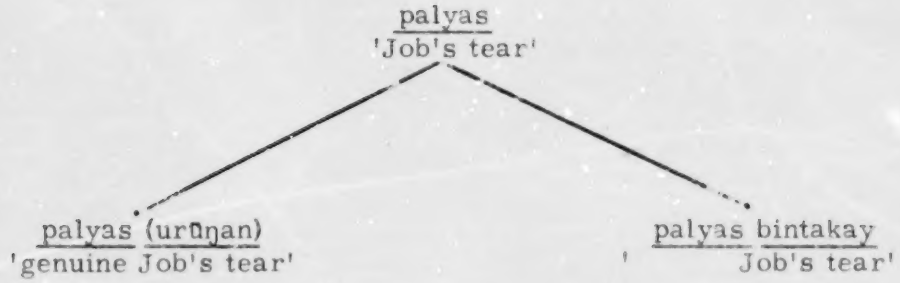
Such a situation is found characteristically in many languages, of which Tzeltal and Hanunóo may be cited as examples.

In Tzeltal, ʔič is the generic name for 'chili pepper' (Capsicum spp.) In most contexts, ʔič can be used alone to refer to the most prominent specific class. However, when greater precision of designation is required, the attributive bac'il 'genuine' is readily applied to distinguish this specific class, bac'il ʔič 'genuine chili pepper' from its contrasting coordinate specific classes. Thus, one finds:

ʔič

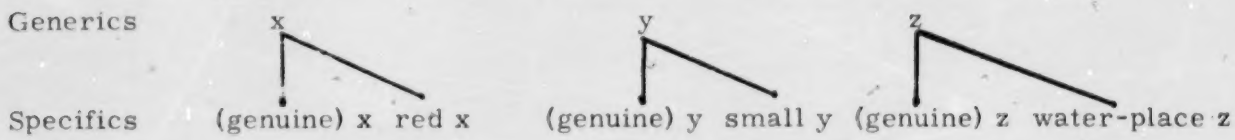
(bac'il ʔič)	cacaw ʔič	caʔmut ʔič	ton ʔič
'genuine chili pepper'	'round chili pepper'	'chicken defecation chili pepper'	'stone chili pepper'

An identical nomenclatural principle has been described for Hanunóo. Conklin, in an as yet unpublished ethnobotany of this people, notes that "...a shared term [i.e. a generic plant name partitioned by two or more specific names] when not followed by an attribute, may be read as that term plus ʔurũnan 'real'. The resulting name is a preferred synonym, required where the designated plant name is distinguished from others in the same set" (Conklin 1954:259). An example can be seen in the classification of Job's tears.



While the type specific remains unmarked, or marked only in contexts where ambiguity might arise, the non-typical specific(s) will obligatorily be marked. The linguistic structure of such non-typical (or secondary) specifics appears to be of a specifiable form. Such names will be comprised of the generic names (in which they are included) plus a modifying attributive-like expression. In all cases, such non-typical specific expressions will be binomial in structure.

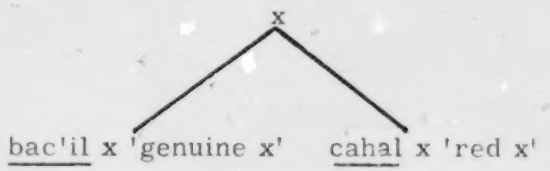
The feature(s) focused on by the modifying attributive-like expression is generally some obvious perceptual dimension such as color, size, growth habit, habitat, or the like. Such a situation may be diagrammatically indicated in the following hypothetical specific contrast sets.



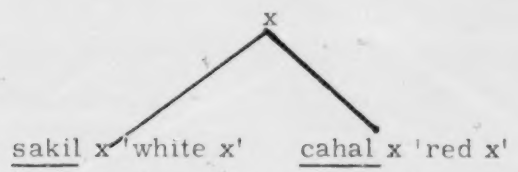
6.3 Fossilization of the type specific attributive

In some languages, especially the Mayan language, Tzeltal, "pattern pressure" appears to be working so as to make the presence of the type specific attributive (i.e. 'genuine') obligatory or independent of context. As an example, the type specific bac'il ʔalčaš 'genuine orange' is almost universally the preferred usage (vs the simple unmarked ʔalčaš) in contexts where it contrasts with forms such as pahal ʔalčaš 'sour orange' ʔelemoneš ʔalčaš 'limon orange', etc. This tendency, I think, represents a later development which follows quite logically from the prior, unmarked usage.

An even further logical sequence can be seen at work in Tzeltal which may or may not have general validity as a subsequent development in all systems. This is seen in few membered contrast sets (i.e., of two or three members) whereby one notes the tendency for the type-specific to assume a value on the semantic dimension indicated in the name(s) of its contrasting member(s). Thus, while a contrast set might have at one time included members labelled as:



where the semantic dimension of color appears indicated in the marked non-typical specific, it now becomes habitually labelled as:



As concerns specific examples where the dimension of color is involved, I think it of no mean theoretical significance that the attributive replacing 'genuine' in the type-specific member is sakil 'white', a rather "typical color" in flower pigmentation (flower color being a major semantic dimension used to differentiate many closely related specifics) and almost neutral, as it were, in terms of its marking potential.

6.4 The development of lexical markings in specific nomenclature

I now want to summarize the theoretical developmental sequence for the lexical marking of specific plant names.

a) First, the generic taxon is partitioned into a type-specific and one (or more) non-typical specific(s). The type-specific is lexically unmarked and polysemous with its superordinate generic. The non-typical specific(s) is lexically marked, a feature leading to a binomial expression. Diagrammatically,

GENERIC x

SPECIFICS x' a x (where a = attributive)

b) Over time, the type-specific must be linguistically distinguished in certain contexts of semantic contrast from the non-typical specific(s). An optional "type-marking" attributive is applied to the type-specific. Invariably it will best be glossed as 'genuine', 'real', or 'most typical'. Diagrammatically:

GENERIC x

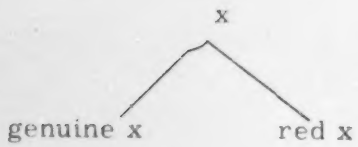
SPECIFICS (genuine) x a x

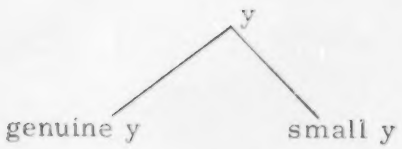
c) In the penultimate stage, time, usage and binomial pattern-pressure of specific nomenclature will force the type-marking attributive, 'genuine', to become obligatory. Once obligatory, its semantic marking function is radically reduced and ultimately it becomes completely neutralized. Diagrammatically:

GENERIC x

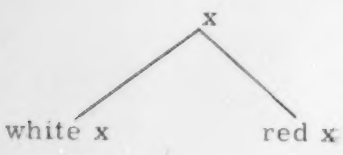
SPECIFICS genuine x a x

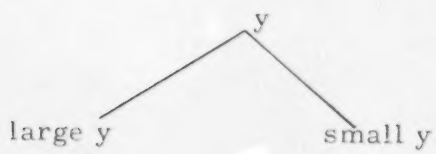
d) In the ultimate stage, pattern pressure will force the neutralized type-marking attributive to be replaced by an attributive from the same semantic dimension as the attributive indicated in the contrasting non-typical specific(s). Thus, a set of forms that were formally:





will become:





7. The rise of major life-form names

While generic and specific names account for the vast majority of names for plants in natural ethnobotanical vocabularies, a smaller number of forms occur which are of greater inclusiveness than generics and specifics. These expressions may be referred to as life form names. At some point in man's classification of the plant world, the concrete differences marked by generic names could be dispensed with in some contexts and higher order abstract names were developed which marked such major life forms as 'tree', 'vine', 'herb' and so on. This is not to say that such categories had not been conceptually recognized by man since earliest times. I find it difficult to conceive that such was not in fact the case. It is highly likely, however, that these higher order categories lacked simple, mono-lexemic designations. The development of life form names is most certainly subsequent to the appearance of generic names in the evolution of ethnobotanical nomenclature.

While very little is known concerning the processes involved in the formation of life form names, it is clear that in many languages the labels for life form categories are drawn directly from the existing inventory of generic names. Furthermore, the labelling of major life form taxa can be seen to follow identical marking principles as those described for generic and specific names. Applying the principles which we have seen to be at work in the case of generics and specifics, one can make fairly

good guesses as to which names get elevated to major class status: precisely those generic names which, because of their distribution and cultural importance, are most salient culturally. In many of these instances, the life form name and its sub-ordinate generic are polysemous.

Buck's massive compilation of synonyms for the major Indo-European languages provides data on the rise of the major life form name 'tree' that bears on this hypothesis: "A widespread group of words for 'tree', many of them meaning also 'wood', go back to an IE word which probably denoted a particular kind of tree, namely the oak" (Buck 1949:48). And again, "Noteworthy is the primacy of the oak, as shown in mythology and in the recurring use of 'oak' as the tree par excellence, for 'tree'" (ibid.:528). Finally, Buck notes the reconstruction "'Oak'. 1. IE* derwo-, dru-, etc. in words for 'oak', and for 'tree, 'wood', the former, specific use being probably the earlier" (ibid).

The most recent and authoritative statement on the proto Indo-European arboreal system is that of Paul Friedrich (1970). Friedrich rejects the generally accepted alternative hypothesis that *derwo originally meant 'tree', rather than 'oak'. His conclusions are especially interesting:

> . . . it seems probable that the primitive, arboreally oriented PIE distinguished several species of oak by distinct morphs, and that *ayg-, *perk^{w}- and *dorw- served in this way. As the oak and mixed-oak forests were reduced and contracted, and as the speakers of the PIE dialects migrated into their new homelands--two simultaneous processes during the third and second millennia--the denotations of the *dorw- reflexes shifted to 'wood, tree, hardness,' and yet other referents; this would hold especially for the shift to 'fir, tar, pinewood' and the like in the Baltic and North Germanic dialects, since the speakers are thought to have migrated into northern coniferous zones during the centuries when the oaks were receding. It is also quite possible that even in PIE times the main name for the oak--a sort of Urbaum--was occasionally or dialectically applied to 'tree' in general. Within pre-Homeric Greek δρῦς and δρυός could denote either 'oak' or 'tree' with disambiguation through social or literary context. By Classical Greek times the meaning had narrowed to the original PIE 'tree'. In more recent centuries the identical process has been documented in Germanic, where eik shifted from 'oak' to 'tree' in Icelandic--oaks being virtually absent in that country. (Friedrich, 1970:146).

While the polysemous origins of life form names in nomenclaturally advanced languages have become obscure, their etymologies determinable only by historical reconstruction, such is not the case with numerous less advanced societies yet in the early stages of their nomenclatural life-histories. In fact, some of these data suggest that one is observing in some languages the actual accension of some supra-generic taxa, suggesting that such languages have only recently moved from the prior stage of ethno-botanical nomenclature of generic names only. Furthermore, it is not surprising to find polysemous generic and life form plant names in languages spoken by societies which are rather simple in their cultural-technological development.

The best reported cases now available to me are found in the Great Basin and the Southwestern areas of the United States, though there are doubtless other examples in other parts of the world. Trager (apparently unaware of an earlier paper by Albert Gatschet who reports the same data) noted that in several Southwestern Indian groups, the word for 'tree' was polysemous with the word for 'cottonwood', the only deciduous tree which grows with abundance outside the major forests. Thus, he notes in Taos Pueblo that "...the ordinary word for 'tree' ...tûłǒna is also the word for 'cottonwood'" (Trager 1939:117). Furthermore, "In Isleta and Sandia (southern Tiwa dialects not very different from the northern Taos and Picuris) the word tûła means 'tree, cottonwood'..." (ibid). Finally, in Hopi, "...we find the same word, sŏhŏ́vi, used for both" (ibid).

A more recent study by Fowler and Leland on Northern Paiute ethno-systematics verifies Trager's observations for this Great Basin people. They state that "...the terms for cottonwood tree [sinábi] can include the willow tree at one level and can also be used in popular speech for any deciduous tree" (Fowler and Leland 1967:387).

In a paper recently brought to my attention by Barbara Demory, Almstedt (1968) reports generic name--life form name polysemy for Diegueño, a Yuman speaking group of Southern California. Here, however,

the term for 'tree', isnyaaw, is polysemous with another ecologically important tree, the California live oak, Quercus agrifolia. This species of oak has the widest distribution and is the most generally available source of edible acorns in the area inhabited by these people. For Aimstedt, "...it seems logical that this name isnyaaw should be used for tree when the need arose" (1968:13).

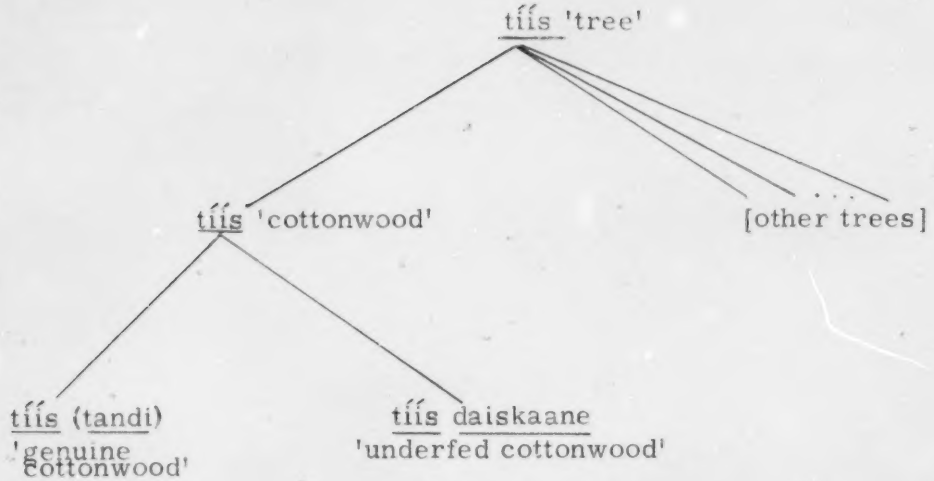
Demory (in press) surveyed additional languages in the Hokan family and found numerous other examples of life form-generic polysemy. In each case, the generic of major cultural significance in that particular geographic area appears to have assumed life form status. Thus in Karok, ʔípahA 'juniper, tree', Achumawi, aswō 'sugar pine, tree'; Atsugewi, ajwi 'kind of pine, tree'; Yana baacul?i 'broad leaf maple, tree'; Salinan, hat' 'oak, tree', Chumash, ku-wu 'live oak, tree'.

Earlier work by Bright and Bright (1965:253-254) reports the term tepo as polysemously meaning both 'fir' and 'tree' and Gatschet notes Klamath k'osh as both 'pine' and 'tree', (1899 II:145).

A final example of this nomenclatural regularity is found in Western Apache as described by Keith Basso. It is made even more important because Basso's data bear both on the rise of major life form names as well as the formation of specific names. Basso writes:

> "The situation among the Western Apaches is much the same as that you describe for the Great Basin and other portions of the Southwest. The term for cottonwood (tiis) is also used for 'tree'; in addition, however--and this is what makes it interesting--tíís may also designate a 'real cottonwood'--namely, those which are tall, heavily foliaged, and situated near the banks of flowing streams and creeks. A few cottonwoods, much more stunted and less green frow in dry washes and arroyos. These are called tíís daiskaane ('cottonwoods underfed'). Tíís in the sense of 'genuine cottonwood' is sometimes labelled tiis tandi 'cottonwood true'/'cottonwood correct'." (Basso, personal communication).

Basso diagrams the taxonomic structure of these lexical items as follows:



A linguistic expression does not become a major class form over-night, however. Presumably, the process is a relatively slow one. Data from Shoshone, another language of the Great Basin, may be relevant at this point. Wick Miller, who has been involved in an extensive study of the Shoshone, notes the common use of sohopi for tree, cottonwood, willow, aspen, stick and log, but is uncertain as to whether the term can be applied to any tree, e.g., "What I do not know, and what would be of particular importance to you, is whether or not these terms [sohopi] can be used generically [i.e., inclusively] that is, can I say, for example, 'an oak tree is a sohopi ('cottonwood tree')?" (Miller, personal communication).

Fowler (personal communication), on further consideration, also questions the use of Northern Paiute siŋábi for all deciduous trees, suggesting that the term might be restricted to aspen, cottonwood and willow. Ash, alder and mountain mahogony, potential candidates for siŋábi, grow outside the Northern Paiute range.

Miller's and Fowler's comments bring up an interesting point as concerns the assumption of supra-generic status by a particular generic taxon. We have no reason to assume that a recently elevated supra-generic should have, at the outset, an extension radically different from that of the generic from which it has arisen. Thus, a term which may eventually come to refer to all 'hard, single-stemmed, erect plants attaining a

specified height' (i.e., 'trees'), might originally be restricted to a small sub-set of 'trees'. In the case of the Shoshone term sohopi, it might be restricted to 'cottonwood-like deciduous trees' (e.g., cottonwood, willow, aspen, etc.) and later come to refer to deciduous trees generally. An even later development might force the extension of the general term to include the obviously abberant conifers, e.g., pines, firs, etc. This surely must have been the case with the general use of Indo-European *derwo from 'oak' to 'tree' in general. A comparable situation is illustrated in Tzeltal where 'tree' is seen to include only truly woody stemmed organisms attaining a specified height, excluding such "obvious" trees (from the folk western point of view) as palms, these latter forms being considered as unique generic classes.

The ultimate extension of the major class supra-generic 'tree' can perhaps best be illustrated in modern American English folk botany where any single stemmed upright plant with leaves at the top is admitted to the class, allowing for the botanically unlikely assortment of such diverse organisms as oaks, pines, palms, banana (trees) and even certain tree-like bamboos.

7.1 The marking of 'type generics'

The examples I have thus far cited have all referred to languages where the culturally central generic term which gives rise to major life form names remains unmarked in common usage, being polysemous with its superordinate supra-generic. Reviewing examples of generic-specific polysemy, might one not also expect to find systems whereby the generic name becomes marked, at least in certain contexts? And might not these instances be seen as a subsequent development, just as was the case in generic-specific polysemy? In fact, such examples are found, though in the fossilized stage of development, in Tzeltal and Tzotzil, although there is also evidence of a similar situation in Kiowa Apache of Oklahoma.

The marking processes distinguishing what now might be called the 'type-generic' are identical to those described earlier for type-specifics.

Thus, if modified, the polysemous form comes to be qualified linguistically with an expression best glossed as 'genuine'.

To illustrate, in Kiowa-Apache, the term for 'tree' is ?ádw while that for 'cottonwood', the most prominent deciduous form, is a-hi , a form literally translated as 'tree-real', i.e., 'genuine tree'. (see Trager 1939: 118). For some speakers of Tzeltal, the term bac'il ?ak' 'genuine vine' (< ?ak' 'vine') occurs as a generic for the most important vine utilized in house construction binding, Smilax subpubescens A. DC. One also finds, for some speakers, the generic bac'il ?ak 'genuine grass' (<?ak 'grass') for the most common and important grass employed as a major thatching in house roofing, Muhlenbergia macroura (HBK). Hitchc. Finally, in Zinacantan Tzotzil, the most important tree, both in house construction and as a firewood, is bac'i-te? 'genuine tree' (< te? 'tree), a form which refers to the prominent oak species of the area, Quercus peduncularis Née.

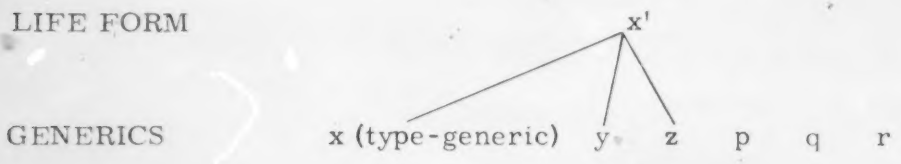
These terms in the Mayan languages just cited are not metaphorical or synonymous expressions for the informants who have them as terms in their respective nomenclatural systems, although synonymous expressions do exist. The fact that the attributive constituent bac'il 'genuine', has become frozen in each case, its presence being obligatory, is quite analogous to the situations whereby the type-marking attributive fossilizes and becomes obligatory in specific names.

Finally, Gatschet (1899) reports a similar body of data from Nipissing, a dialect of Ojibwa. Here andak means 'evergreen tree' and inin andak 'real evergreen tree' or 'pine'. Likewise, ātik 'deciduous tree' includes the generic name inin ātik 'real deciduous tree', i.e., 'maple'. One can see how a culturally central generic name in each case has become obligatorily marked linguistically by the form 'genuine'.

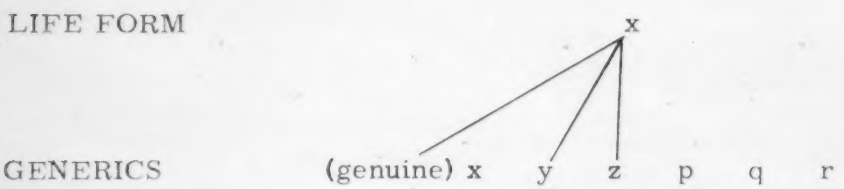
7.2 Summary of the development of life form names

The theoretical development sequence for the appearance of major life form taxa may now be summarized as a series of at least four steps.

a) At the outset, the newly encoded life form category is labelled polysemously with the most common generic form from which it was derived. Its extension is, at first, rather limited, perhaps only to those generics which are seen to be quite similar to the type-generic. Diagrammatically:

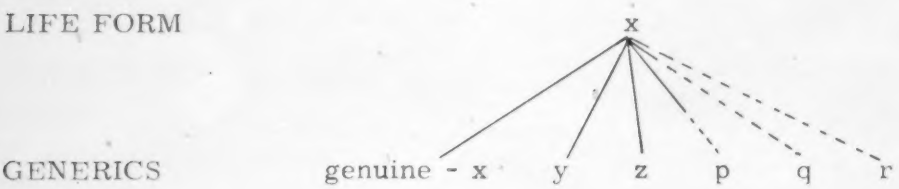


b) Over time, the type-generic comes to be optionally marked, linguistically, with the type-marking attributive, 'genuine'.

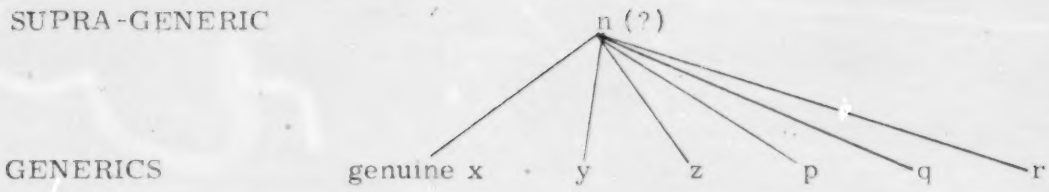


c) Further development leads to the fossilization (neutralization) of the type-marking attributive, 'genuine', and it becomes obligatory.

Meanwhile, the life form is expanding its referrential extension, including taxa originally excluded.



d) Final stages of growth are indicated when polysemy is totally obscured in the current forms, the original expressions having been replaced or otherwise changed.



8. The appearance of varietal names

It would appear that the naming of varietal taxa will, in general, follow the appearance of the major life form taxa. This is not a contradiction, as it might at first seem, of the tendency for abstract terms to occur later in a language's history than highly specific ones. It is a reflection of the greater control over the processes of domestication that man has acquired only through long millenia of trial and error methods. All of the information available to me at the moment shows that legitimate varietal names occur almost exclusively in the classification of important cultivars. I would imagine that the same holds true for animals. The control over nature that is required in selecting and maintaining a particular race of corn, beans, rice, chili-pepper, squash or what have you, morphologically distinctive enough to merit habitual lexical designation, can be accomplished only by relatively advanced horticulturalists. Accordingly, one should not expect to find varietal ethnobotanical nomenclature in the languages of societies which do not practice rather refined methods of cultivation. Even in these languages, varietal names will be restricted to highly important groups of plants.

Given the appearance of varietal taxa, however, it appears relatively simple to specify the linguistic structure of names used to refer to such taxa. In all cases, the specific name (logically of the form attributive, generic, order being irrelevant) will be formed by the addition of another attributive. And, as one might expect, the processes of lexical marking described earlier apply equally well in varietal name formation.

The general principles seen to be at work can be illustrated firstly in Tzeltal. In this language, the generic taxon lo?bal 'banana' includes at

least twelve distinct specific classes, e.g., bac'il lo?bal 'genuine banana', sakil lo?bal 'white banana', sera lo?bal 'wax banana', cahal lo?bal 'red banana', etc. One of these specific forms includes two varietals labelled in the expected manner, i.e., the type-varietal occurring unmarked, in typical usage, but marked with the type-marking attributive, 'genuine', if ambiguity occurs, and the non-typical varietal being obligatorily marked. Thus one notes the forms:

(bac'il) cahal lo?bal	'(genuine) red banana'
sakil cahal lo?bal	'white red banana'

It is rare that varietal names include more than two modifying expressions i.e., indicate classes of greater specificity than "first-order" varietals. In Hanunóo, of the 1094 terminal taxa that are specific or varietal names, 961 are specific taxa and 97 are varietals. Of these 97 varietals, 87 are first-order forms, i.e., marked only by two attributives. Only two generic names include 'sub-varietals' comprized of more than two attributives and these occur in the highly important cultivars, corn and chili peppers (Conklin 1954:).

In actual speech, it is also rare that a varietal be referred to by its 'full name'. There is a strong tendency for such forms to participate in what Conklin has called "abbreviation" (Conklin 1962:122), i.e., when a part of the name may be used to stand for the varietal class as a whole. In such cases, abbreviation will lead the primary i.e., specific) attributive to function as a head of the expression, the resulting form in most cases being, then, binomial in form. As an example, note the English varietals:

butter lima(s) bean
baby lima(s) bean

where butter lima(s) and baby lima(s) may occur as complete expressions.

The same can be noted in Tzeltal, also for beans, where one notes the forms:

cahal šlumil čenek'	'red ground beans'
?ihk'al šlumil čenek	'black ground beans'

where cahal šlumil 'red ground [ones]' and ?ihk'al šlumil 'black ground [ones]' can occur alone.

9. The problem of intermediate taxa.

In examining the ethnobiological lexicon of numerous languages, I have noticed a strong tendency for the hierarchical depth of biotaxonomies to be uniformly shallow. Superordinate taxa of greater inclusiveness than the folk genus, the life form names, are invariably few in number and are inclusive of the majority of all named taxa. Subordinate taxa of lesser inclusiveness than folk genera, i.e. specific names, are likewise few in number and occur predominantly in those taxa with critical cultural importance (e.g., cultivated plants or domesticated animals). One may generalize and claim that most folk biotaxonomies are comprized primarily of named generic, major life form, and specific taxa, with generic classes being by far the most numerous and psychologically significant.

Covert "mid-level" categories of greater inclusiveness than folk generic but not yet life form categories may be seen to exist in many taxonomies and their recognition os of crucial importance to a full understanding of the complete classificatory structure (see Berlin, Breedlove, and Raven 1968). However, the fact that these mid-level categories have not been labelled suggests that the need to distinguish such classes is as yet relatively unimportant in most cultural contexts.

Nonetheless, the question remains: Why are named intermediate taxa almost totally absent in natural ethnobiological taxonomies? The conclusion that I have tentatively come to is that such taxa are rare because they are basically unstable categories, a point which will be developed below.

How are named intermediate taxa likely to arise? At one point, it was suggested that the already present covert categories of this taxonomic rank

would be the most probable candidates for labelling (see Berlin, Breedlove, and Raven 1968:). As research continues, this hypothesis appears not to be verified in fact. What has been discovered, however, is that named taxa of less inclusiveness than major life forms yet more inclusive than folk generics appear primarily as a response to situations whereby native polytypic generics must be distinguished from newly encountered generics (see now Berlin, Breedlove, and Raven, n.d., for a detailed discussion).

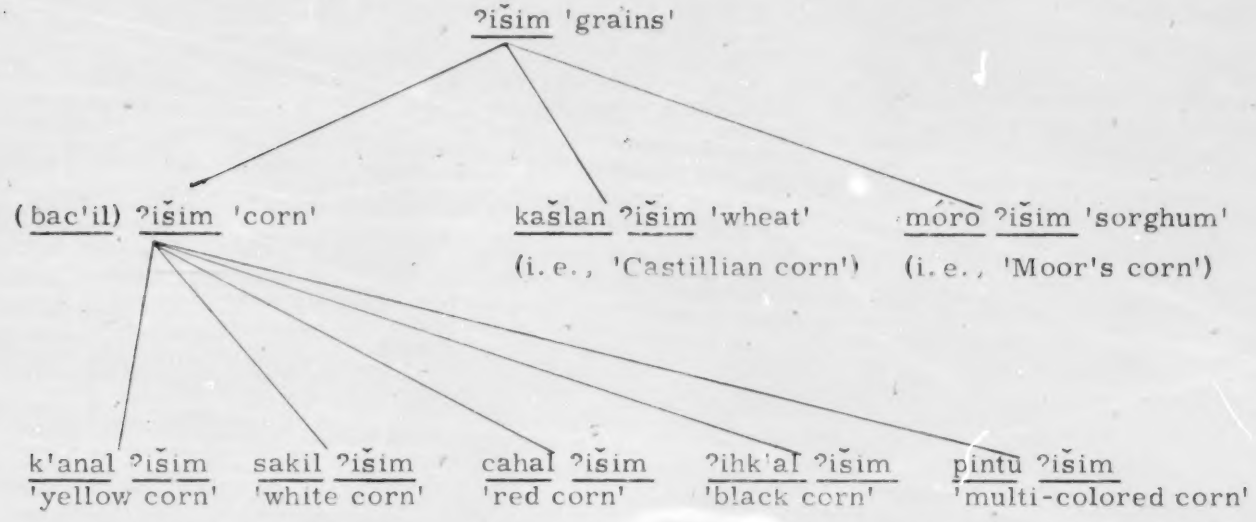
Thus far, two distinct processes--or better said, paths--have been observed that account for the rise of named intermediate taxa. The first occurs in culture contact situations where certain introduced organisms must be incorporated into the native taxonomy. If the introduced plants are conceived to be similar--in the native view of the world--to a named polytypic native generic class and yet not similar enough to be included as a legitimate specific of that generic, a named higher order taxon will arise which includes both the native and introduced forms.

The second process, not as clearly understood as the first, occurs when some specific taxa become "conceptually" distinct from their neighboring specific taxa. When this occurs, the conceptually distinctive taxon will assume the status of a generic, will cease to be labelled by a binomial expression, and in so doing, will force the original generic to assume a superordinate taxonomic status.

The first process can be illustrated with examples from Tzeltal. At the time of the Hispanic Conquest, the highland Mayan groups were introduced to two similar and yet quite distinct grain crops, wheat and sorghum. These grain-bearing crops were considered to be similar by the Tzeltal population to their own polytypic generic class of native corn, ?išim. Logically enough, the two introduced classes were linguistically designated as kašlan ?išim 'Castillian corn', i.e., 'wheat' and móro ?išim 'Moor's corn', i.e., 'sorghum'. Their conceptual affiliation with corn is verified in that both names occur as responses to the query, bitik sbil huhuten ?išim "What are the names of each kind of corn?" Further questioning, however,

clearly demonstrates that these two introduced plants are not kinds of genuine corn, or, as the Tzeltal would say, not bac'il ?išim .

The new taxonomic structure, then, is seen as one where a superordinate class of greater inclusiveness than those which have been considered as generic groupings, has arisen. Diagrammatically:



The newly formed superordinate taxon, ?išim , may best be glossed as 'grains', at least for the moment. And, in precise accord with the processes of lexical marking described earlier, the type-generic 'corn' is marked optionally by the attributive bac'il 'genuine' distinguishing it, in situations of ambiguity from 'wheat' and 'sorghum'. Otherwise, it is polysemous with the newly formed superordinate intermediate taxon, 'grain'.

Nomenclaturally, the recently introduced generic names are binomial in structure an in this respect do not conform to the otherwise linguistically unitary structure of other generic names. Time and usage, however, will tend to neutralize the marking properties of the attributive forms kašlan and móro and the expressions will come to be conceived of as single, semantic units. Geoghegan has aptly characterized the process as follows:

> "Either because of frequency of perception, need to communicate or what-have-you, a single pattern can be established... i.e.,

> rather than identification proceeding from the use of two patterns, as in the first stage, a single unsegmented pattern recognition routine comes into use. At this point, the [complex] nature of the coding no longer has support (since only one feature rather than two is being used), and the complex term will have a tendency to decay, [becoming] a lexeme with a unitary cognitive representation" (Geoghegan, personal communication).

A strikingly similar situation to that described for the Tzeltal data can be seen in the classificatory treatment of the introduced New World sweet potato (Ipomea batatas), among the primitive peoples residing in the vicinity of Mt. Hagen in the Central New Guinea Highlands. The Mt. Hagen material illustrates, furthermore, the interplay of lexical marking and cultural significance in an interesting and important way.

In Hagen ethnoscience, oka refers to the sweet potato, I. batatas. Oka mapumb, a contrasting generic, refers to the indigenous edible tuber, Pueraria lobata. A third name, oka koeka, refers to a wild, inedible tuberous vine and oka kombkla to a wild tuberless vine with leaves similar to oka.

Marilyn Strathern reports that all of the four above names are considered conceptually similar to one another in terms of a variety of characters. On the other hand, it is clear from Strathern's paper that each form refers to a distinctive generic class. Thus, oka mapumb, 'Pueraria' is not a kind of oka.

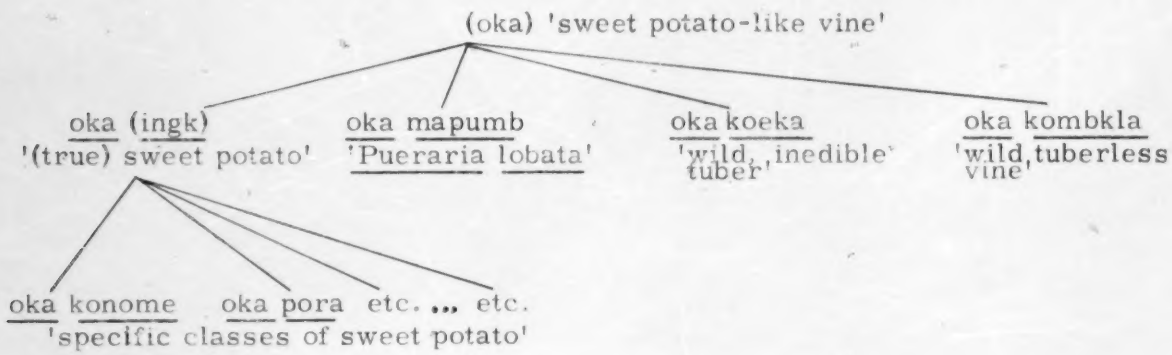
> "Oka mapumb (Pueraria) may be contrasted with oka ingk (true [ingk] oka, i.e., sweet potato) or with oka alone, which, when unqualified, always refers to sweet potato [sic]. Only if modified by mapumb, koeka, etc. does oka mean something other than sweet potato. Conversely, Pueraria can only be referred to by employing a special suffix such as mapumb; it is never just oka" (M. Strathern 1969:193).

Furthermore, additional evidence shows that oka is partitioned into various specific names, none of which include the forms oka mapumb, oka kombkla, etc.

In Strathern's words:

> "Oka (sweet potato) may be divided into numerous secondary taxa. When collections of these names were made, only once did mapumb enter any list. In all the other cases the secondary taxa referred to divisions of oka = sweet potato, and excluded any mention of oka mapumb. Mapumb is thus not seen as a named type of sweet potato on a par with the other varieties (konome, pora, etc.)" (Strathern 1969:193).

The linguistic and ethnographic evidence suggests that one may characterize the Hageners classification of the plants involved as follows:



The Mt. Hagen example, then, can be said to be strikingly parallel to the Tzeltal treatment of grains. Here one sees the possibly covert recognition of an intermediate taxon, oka 'sweet potato-like vines' that includes not only sweet potato but as well Pueraria and related vines. Unlike the Tzeltal case, however, the introduced generic, oka, has come to assume unmarked status, being optionally marked only in contexts of ambiguity. While the details of this development are unclear, one may make several inferences which are fairly well supported on linguistic grounds.

It is highly likely that at one point, before the introduction of the sweet potato, oka, referred, in its unmarked form, to Pueraria lobata. The terms oka koeka 'wild inedible tuber' and oka kombkla can be seen simply as examples of generic name extension formed on the basis of analogy as discussed in section 4.1.

With the appearance of sweet potato, clearly morphologically similar to P. lobata, one can surmise a period whereby the class linguistically referred to as oka x, where x must have represented some unknown

qualifying expression.

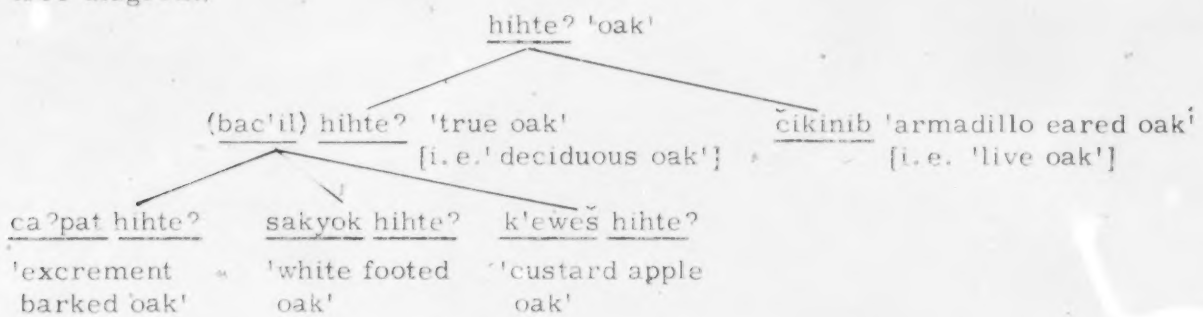
Through time, the cultural importance of sweet potato increased dramatically, eventually exceeding that of P. lobata. At some point in this process, oka came to refer, in its unmarked form, to sweet potato and P. lobata became obligatorily indicated by the complex expression oka mapumb.

In fact, a process identical to the one just supposed can be documented with some accuracy for certain Tzeltal animal names, (see section 11).

The second process whereby superordinate intermediate taxa are named does not necessarily result from the introduction of new organisms. This situation occurs when a native specific assumes the status of a generic category. There may be a period in the process when the distinctive (conceptually) specific taxon is labelled by a unitary lexeme and not the standard binomial expression characteristic of most specific taxa.

The process can be illustrated by an example from Tzeltal and concerns the classification of oaks. For most informants, the generic hihte? 'oak' includes four specific taxa, ca?pat hihte? 'excrement barked oak', sakyok hihte? 'white footed oak', k'eweš hihte? 'custard apple oak', and čikinib hihte? 'armadillo eared oak'. This latter form may, for most informants, be cited in abbreviated form, i.e., simply čikinib. For some informants, the abbreviated form is, indeed, the preferred usage.

Some Tzeltal speakers, however, recognize only the first three classes of oaks as (bac'il) hihte? '(genuine) oaks' and treat čikinib as being a closely related but distinct and coordinate taxon. One Tzeltal Indian for whom the above classification of oaks holds, produced the following folk tree diagram:



That such a situation could arise is partially explained by the fact that čikinib is by far the most divergent class of oaks referring to the native live oaks of the area (Quercus acatenangensis, Q. sapotaefolia). čikinib possesses scores of objective characters which readily distinguish it from the other three deciduous classes of '(true) oaks'.

I lack direct evidence that the higher order taxon hihte? is at the present time a fully stabilized taxon, and, as will be pointed out below, it never may become so.

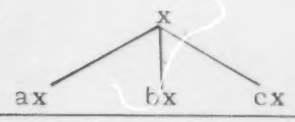
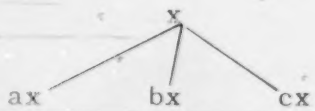
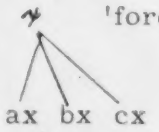
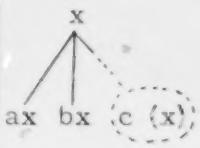
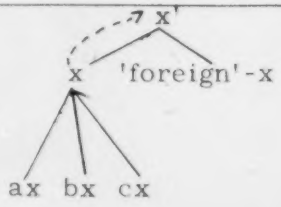
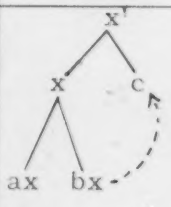
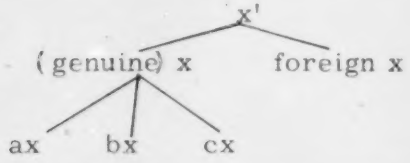
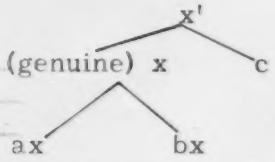
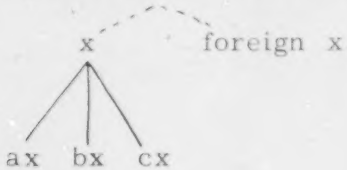
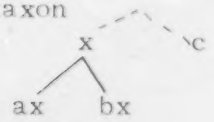
In both of the examples just described it would appear that the intermediate taxa which have arisen are each unstable as the new generics continue to be used over time. In the case of the introduced grains, it was suggested that the new forms become conceptually "a single unsegmented pattern", to use Geoghegan's phrasing. In the case of čikinib, already a monolexemic form, the prior linguistic affiliation with hihte? is eventually lost (neutralized?) and the optional marking of the type generic (bac'il) hihte? will most likely be eliminated. One may predict that the same will occur with the type generic, (bac'il) ?išim. The final result will be the ultimate loss of the intermediate taxa, as named categories, although conceptually they will clearly continue to remain.

9.1 Summary of the development of intermediate names

One may summarize in tabular form the sequential steps that lead to the formation and final loss of named intermediate categories in Table I.

Table I

Hypothetical stages involved in the formation and subsequent loss of intermediate taxa

	Path I	Path II
1.	 initial situation: native generic with included binomial specifics	
2.	introduction of a new class not similar enough to be included in native polytypic generic yet similar enough to allow for concrete transposition. 	 conceptual distance of one included specific is increased being considered more distinct from neighboring specifics. Such specific comes to be referred to by monomial alone. e.g., Tzeltal čikinib.
3.	rise of intermediate taxon, x', including polytypic native generic and introduced 'new' generic, x and x' are polysemous. 	 assumption of generic status by conceptually distinct specific, c, placing it in contrast with type generic, x, and consequent rise of intermediate taxon, x'. x and x' are polysemous.
4.	 optional marking of type - generics with the expression 'genuine', 'true' to contrast them with recently formed or introduced taxa	
5.	unlike generics which are the source of major class taxa (e.g., 'tree', 'vine', etc.), marking of type-generic never becomes obligatory	
	as the introduced item is neutralized over time and optional marking of type generic is eliminated leading to subsequent loss of intermediate taxon 	over time, prior linguistic (but not necessarily conceptual) affiliation with x is lost (neutralized) and optional marking of type generic is eliminated leading to subsequent loss of intermediate taxon 

10. The linguistic recognition of 'plant'

While man has no doubt tacitly recognized the world of plants as a conceptual category since earliest times, it does not appear to have been essential to provide the concept with a distinctive label until quite recently.

In contemporary languages of primitive peoples, a single, unique expression for 'plant' is notably lacking and there is no reason to assume that such was not the case in prehistoric times. Interestingly enough, when the notion of 'plant' is expressed, it is done via circumlocution or by the use of a form which is polysemous with some lower order major life form term. We might surmise an identical situation in Theophrastus' time where it does not appear that a single common expression for the full category of the plant kingdom existed. The term Theophrastus chose for the domain as a whole, φυτόν, was in every day usage the word for cultivated plant, or 'herbaceous plant of cultivation', with the sometimes restricted meaning of '(cultivated) tree' (Greene 1901:110).

In Kirwinian and Hanunóo, the term for 'tree' can be used in some contexts to refer to plants in general (Malinowski 1933: , Conklin 1954:). Likewise, in Ilongot, ra?ek is polysemously 'herbaceous plant' [i.e., not 'vine' or 'tree'] and 'plant' (S. Rosaldo, personal communication). Furthermore, in Spanish, planta appears polysemously as 'herbaceous plant, plant'; in Latin, note herba 'grass, plant', and Russian trava 'grass, plant'. These data, while not conclusive, would seem to validate the suspicion that the label for the unique beginner in plant taxonomies is often drawn from one of the major class taxa, replicating a nomenclatural process which we have seen to be quite general in other areas of ethnobotanical nomenclature.

On the other hand, there is some evidence that the term for the unique beginner might in some languages derive as a compound. In ancient Sumerian, the concept 'plant' was apparently designated by the conjunction of three lower-order terms which translated approximately as 'tree', 'grass' and 'vegetable' (Robert McC. Adams, personal communication). This corresponds quite well with what we know of ancient Latin, where the expression of 'tree', 'herb' (arbor et herba) was used to designate the more general concept. In this

regard, Ullmann notes:

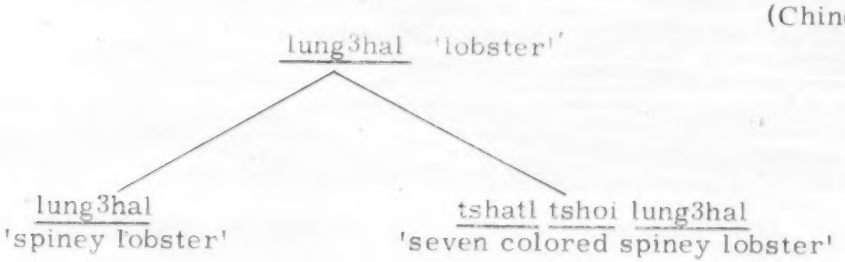
> "There was in Latin no generic term for 'plant' in the modern sense: arbor and herba were the most comprehensive class-concepts in the botanical field. According to a recent enquiry, the modern meaning of 'plant' is first found in Albertus Magnus in the 13th century, whereas the French plante did not acquire this wider sense until 300 years later" (Ullmann 1963: 181).

Finally, while there is no commonly recognized term for 'plant' in Tzeltal, there are instances where something like the notion can be expressed by the compound te?-?ak' , literally 'tree-vine'. It might be suggested that we see something like this going on in English folk biology, when we attempt to refer to the concept 'living things' often by the phrase 'plants-and-animals".

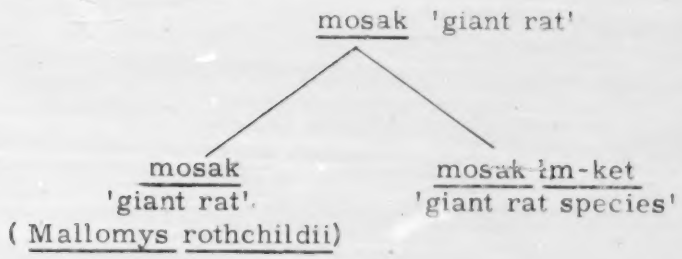
11. Ethnozoological parallels

While I have restricted my survey of the development of ethnobiological nomenclature to categories of plants, it should not be surprizing to find rather close parallels in ethnozoological nomenclature. The data in this area are far from complete but those I have seen suggest that identical nomenclatural processes are at work. Type-specific--generic name polysemy can be found in animal names as well as in plant names. Thus, in the Chinese of Hong Kong Harbor, the Karam of New Guinea, and in Guarani of Argentina, one notes examples such as seen below (Anderson 1967: 71; Dennler 1939:233; Bulmer 1968:622).

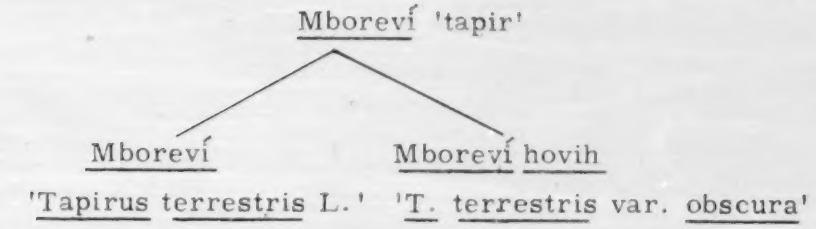
(Chinese)



(Karam)

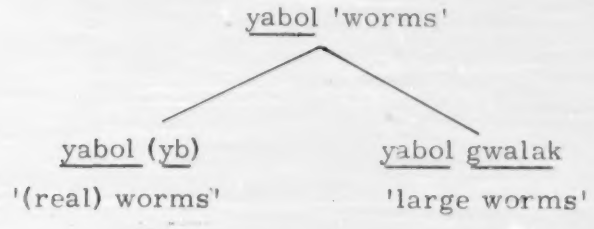


(Guaraní)

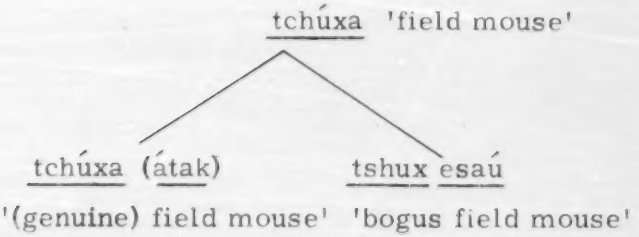


Furthermore, the optional marking of the otherwise polysemous type-specific with an attributive glossed as 'genuine' is also found in animal nomenclature. Some selected examples are seen from Karam and Tonkawa (Bulmer 1968:624; Gatschet 1899:160):

(Karam)



(Tonkawa)



Apparently, generic name--life form name polysemy is also a process observed in the development of ethnozoological nomenclature. Gatschet, in his large Klamath grammar notes that the Klamath "...often use... wishink 'garter snake' for 'snake', the Modocs wámènigh (black snake) for the same order of reptiles, these species being the most frequent of their kind in their respective countries" (1890:II.145). In Pomo, notes collected by the zoologists A. Hart Merriam (n.d.) show the form shah as meaning polysemously 'salmon' and 'fish' while in Shoshoni of the Snake River drainage we find ?akai 'salmon, fish' (Wick Miller, personal communication). From Karam, Bulmer (1968:) reports kmn as generically 'small edible animals' but as well a life form name indicating all 'game animals'.

As concerns evidence indicating type-generic lexical marking analogous to that found for plant names, Gatschet cites guáto 'bird' and guató-hi 'real bird, i.e., eagle'; likewise, sane is 'snake' while sanehi refers to 'rattlesnake, i.e., real snake' (Gatschet 1890:II.145).

I have only one example of life form--unique beginner polysemy in ethnozoological nomenclature. In Orok of Sakhalin Island, Austerlitz (1959:211) notes buju as meaning both 'bear' and 'animal'. It is not unlikely, however, that polysemy of this type will also be found widely as more information becomes available.

Finally, data from Tzeltal ethnozoology would seem to replicate in important ways some of the problems suggested in the discussion of the formation of intermediate taxa, especially as concerns the classificatory treatment of introduced organisms in the case of the New Guinea Mt. Hagen materials.

At the conquest, the Spanish introduced to the Tzeltal three domestic animals which were to assume critical cultural importance: chickens, sheep and pigs. For each of these introduced organisms, there existed native classes for which the foreign animals could be seen as similar, namely, birds, deer and wild pigs.

On historical linguistic grounds, we know that the Pre-conquest Tzeltal terms for these native forms were mut 'bird', čih 'deer' and čitam wild pig. The situation at the present time is, however, as follows:

mut 'chicken'	vs	teʔtikil mut 'bird' (lit. 'forest chicken')
čih 'sheep'	vs	teʔtikil čih 'deer' (lit. 'forest sheep')
čitam 'pig'	vs	wamal čitam 'wild pig' (lit. 'brush pig')

In each case, the unmarked form has become restricted to the introduced animals, while the aboriginal organisms have become linguistically marked. Full information is lacking on the complete historical cycle leading to this outcome, but there are sufficient data to suggest that the situation is very close to that seen in the Mt. Hagen treatment of oka.

One may note the following developmental sequence for one item of the set, čih 'deer'.

Pre-conquest:

čih 'deer'

Conquest:

čih 'deer' tunim čih 'sheep' [lit. 'cotton deer', attested in some contemporary dialects of Tzeltal]

Early post conquest:

(teʔtikil) čih 'forest deer' tunim čih 'cotton deer' (Optional marking of native form).

Late post conquest:

teʔtikil čih [obligatory marking] (tunim) čih (optional marking)

Present:

teʔtikil čih 'deer' čih 'sheep' [optional marking of introduced form has become unnecessary]

In both the Tzeltal and Mt. Hagen data, it seems clear that similar processes have been followed leading names for introduced organisms from a lexically marked to lexically unmarked status and that this process in directly related to the high cultural significance of the organisms involved.

12. An aside concerning nomenclatural devolution

In the beginning, I noted that vocabularies of languages tend to increase in size over time. This is, of course, generally true when total vocabulary is considered. Specific lexical domains, however, undergo not only growth but as well decay. As with lexical expansion, the likely underlying causal mechanisms must be ultimately related to cultural evolution. Whole sale vocabulary loss in some specific area must be due in part, at least, to the lessening of cultural importance associated with that particular area of human concern. Examples of such nomenclatural devolution can be found in almost any area of vocabulary, terms for agricultural implements or carriage lexicon being obvious examples in English.

As concerns ethnobotanical nomenclature particularly it now seems likely that the direction of vocabulary loss will be from the particular to the general. To use the terminology of my colleagues Kay and Geoghegan, loss will occur "from the bottom up". With little introspection, speakers of English who have been reared in an urban setting will recognize at once that they know virtually no specific names for kinds of plants, that many generic names are recognizable linguistically only as "names" of plants, the organisms referred to being totally unfamiliar. Nonetheless, abstract life form names, such as 'tree or 'grass' apparently remain as useful terms for referring to an ever shrinking (both literally and figuratively) portion of one's natural environment.

The topic is an intriguing one deserving further study and English would be as good a language as any on which to begin research.

13. Conclusions

Assuming a uniformitarian view for the growth of ethnobotanical vocabulary, I have attempted to outline a plausible sequence of development of nomenclatural categories characteristic of man's linguistic recognition of the plant world. I have argued for the primacy of generic taxa as the first ethnobiological categories to become encoded in a language's plant lexicon. Expansion appears to be horizontal at first, and with enlarging experience, develops both by differentiation and generalization. A similar argument has been made by Brown in reference to vocabulary as acquired by the child (Brown 1958) so one might suspect the process discussed here to have wider ontogenetic applicability as well.

Six major linguistic categories have been posited as sufficient for describing the names for classes of plants in all languages. It appears highly likely that these categories become encoded in the history of any language in the following order:

generic → { life form / specific } → { intermediate / varietal } → unique beginner

An additional claim has been made which states that with the encoding of each category a specifiable process of lexical marking is operable, leading plant names from a lexically marked to a lexically unmarked status.

If the principles I have discussed prove to be general, they could allow for a plausible typological classification of the various types of ethnobotanical nomenclature seen in the languages of the world. It is also likely that a similar classification may be appropriate for ethnozoological nomenclature. I would speculate that the typological classification can best be interpreted as indicative of how plant nomenclature becomes encoded diachronically.

But a classification is not a theory. It is one thing to describe typological regularities and to suggest that their interpretation is best understood historically. It is quite a different task to outline the developmental processes involved in the change of one system into another.

On the other hand, one usually searches for causal explanations only after one has observed something that might be interesting to explain. Until recently studies into the nature of the growth of vocabulary have been accorded little importance in linguistics and anthropology. I believe that as detailed descriptive reports reveal conclusively that aspects of man's lexicon develop in a regularly patterned fashion, efforts towards providing theoretical explanations of the processes involved will be increased. While I cannot predict what mechanisms will be finally suggested as causal explanations as future work proceeds, it seems likely that the details underlying the development of vocabulary must eventually be encompassed within some more general, technologically based theory of cultural evolution.

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